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NEW TECHNIQUES, INCLUDING REMOTE SENSING, FOR IDENTIFYING, EXPLORING FOR AND ASSESSING NATURAL RESOURCES

Information referral systems on satellite remote-sensing data

Report of the Secretary-General

SUMMARY

The present report provides information to help developing countries gain access to remote-sensing systems through commercial outlets, so that they may make the optimum use of their natural resources. It also summarizes the activities of the Natural Resources and Energy Division of the Department of Technical Co-operation for Development in the application of remote sensing. In order to intensify efforts in the dissemination of available remote-sensing data, the Department provides technical assistance to developing countries in the planning, construction, maintenance and operation of remote-sensing technology. Included in the report are recent price schedules from the major commercial outlets dealing with remote-sensing data derived from satellites.

* E/C.7/1991/1.

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INTRODUCTION

1. At its eleventh session, in 1989, the Committee on Natural Resources recognized the need for developing countries to have access to the information obtained by remote sensing in order to make the optimum use of their natural resources. In resolution 1989/8, the Economic and Social Council, on the recommendation of the Committee at its eleventh session, took note of the two options proposed in the report of the Secretary-General on an information referral system on satellite remote-sensing data (E/C.7/1989/2) and requested the Secretary-General to submit an updated version of that report to the Committee at its twelfth session.

2. Also in resolution 1989/8, the Council requested the Secretary-General to explore appropriate ways and means by which the developing countries could gain easier and increased access to remote-sensing systems in order to optimize the exploration and exploitation of their natural resources; and, with respect to the application of remote-sensing technology, requested him to intensify his efforts, within existing resources, in the dissemination of available remote-sensing software packages in both the commercial and the public sectors for the exploration, exploitation, management and development of natural resources through application-oriented workshops, seminars and training courses to be organized at the regional or the country level in developing countries.

I. THE EXPANDING USE OF REMOTE-SENSING TECHNOLOGY

3. The use of interpreted satellite remote-sensing data is now an operational procedure for resources managers in both the industrialized and the developing countries. Satellite data are available routinely from world-wide weather satellites at a nominal cost, and from the commercial land-sensing satellites, Landsat and SPOT. Data acquisition by satellite has been established in Canada, India, Japan, the Union of Soviet Socialist Republics and Europe.

4. Recent developments in user-friendly, higher storage capacity, low-cost integrated image processing hardware and software systems and the growth of geographical information systems (GIS) as a technical discipline have expanded the potential of remote-sensing applications. Although many systems, both PC- and minicomputer-based, are available, few have been proved in operational environments and fewer still are expected to withstand the rigours of installations far removed from customer service and software support.

5. Numerous computer-based systems for processing and analysing remotely sensed data are available. The systems range in price from $US 20,000 to more than $US 1 million, and the range in capabilities is at least as great. Reliability and detail of documentation in a developing country environment are key factors when a choice has to be made among technically similar systems.

6. World-wide interest in the Landsat and SPOT programmes has drawn users from more than 100 countries. Fifteen countries already have the facilities to receive,

READEX FICHE

process and distribute data products. An increasing proportion of the more than 10,000 users of Landsat and SPOT information is processing digital data instead of relying on traditional photo-interpretation techniques. This shows that a demand for faster digital data processing and higher quality hardware and software packages has evolved, creating a growing and valuable international service industry.

7. It has been pointed out that the information requirements in developing countries may vary in form or emphasis, but basic needs are the same. Remote sensing can contribute significantly to meeting these needs, though it is a tool that must be used in conjunction with conventional survey and data collection techniques. Remote sensing is not a panacea. In the developing world, however, where resource data are scarce and time and funding constraints severe, it is widely acknowledged as a valuable tool for filling the information gap. 1/

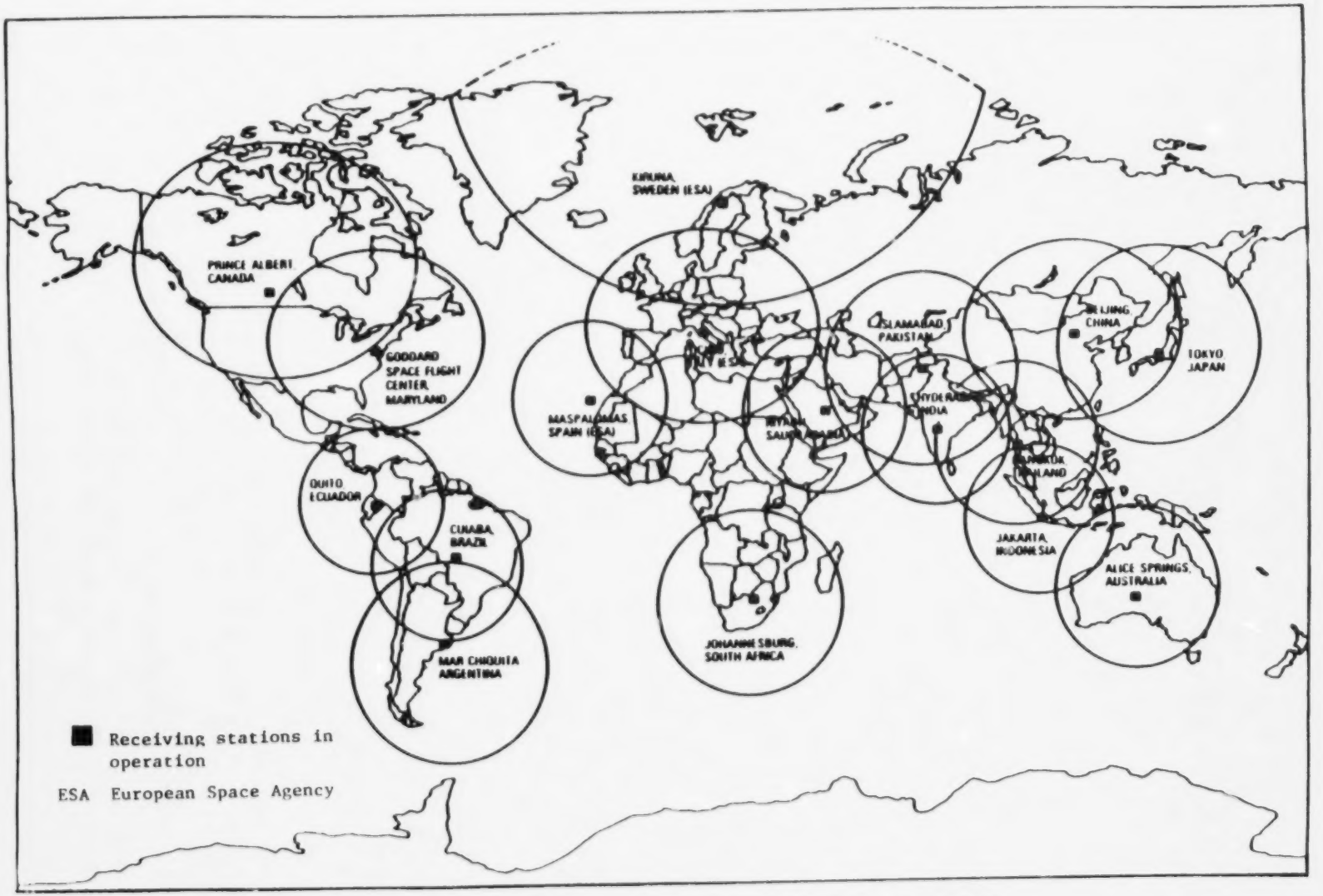
8. Satellite data are available from a variety of satellites - meteorological, environmental and resources satellites, for example. Data can be obtained in different formats and in real time from receiving stations. As at 1990, under the Landsat programme, a total of 16 receiving stations have been established world wide. The location of receiving stations in operation is shown in the figure.

9. Many developing countries have made a heavy capital investment in developing their own ground facilities. However, they now face the problem that continued data access is not guaranteed, either because of a cutback in the programme of the country providing the satellite services or because of a malfunction of the satellite with no prospect of an immediate replacement. 2/ This is of particular concern to those countries. Under agreements signed with the Earth Observation Satellite Company (EOSAT), an international Landsat data distribution network has been established in order to provide access to data under commercial agreements.

10. It has been pointed out that recent developments in user-friendly, higher storage capacity, low-cost image processing hardware and software systems, and the growth of GIS as a discipline, have expanded the capabilities and applications of remote-sensing computer systems for image processing and image analysis. The operational use of these systems in developing countries is increasing, and they will contribute to meeting information needs. It should be borne in mind that image-processing capabilities must include the production of hard copy outputs.

11. Issues of concern in the developing world include the absence of remote-sensing systems, the incompatibility of systems, less than effective infrastructural arrangements and inadequate information on natural resources. Frequently, remote-sensing systems and products that do not fully address the needs of the developing countries or their capacity to pay for maintenance and continued operation are developed. In many cases, programmes are geared to address the means and methods of providing aid, rather than the intended product. Cost-effective solutions are therefore needed, not just high-cost sophisticated processes.

12. Shortcomings in technical advice to funding bodies, which result in the funding programme objective not meeting the real needs of developing countries, have been identified as another concern. The goals and objectives of funding



LANDSAT 4/5 COVERAGE

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programmes need to be tailored to ensure not only that the skills and expertise of technical advisers are provided but that "client" needs are met. Developed countries could best contribute to development programmes by ensuring that technical expertise is co-ordinated.

13. At present there is no clear indication that either international organizations or donor countries set priorities for the application of remote sensing. Some developing countries are clearly making major investments in this direction, but there is no consensus about the overall direction of funding. There is considerable reliance by some developing countries on development through external support and bilateral co-operation. However, the concerns of countries relate not so much to starting-up arrangements, as to the ongoing costs of maintaining new systems.

II. ACCESS TO REMOTE-SENSING DATA

14. In the report of the Secretary-General (E/C.7/1989/2), it was suggested that, in view of the continuing financial constraints of the Organization, the Secretary-General use, to the greatest extent possible, existing data banks and referral systems as a basis for assisting interested Member States. In order to optimize the benefits to developing countries, information on access to remote-sensing systems through commercial outlets is provided below.

A. EOSAT

15. EOSAT offers a selection of map-oriented Landsat digital data products. This map-oriented digital imagery enables operators of geographical information systems to use Landsat data easily, with less pre-processing. As a result, satellite mapping products of high quality can be obtained.

16. Geocoded products represent the most precise unenhanced Landsat thematic mapper (TM) data available. Customers can request data in any map projection supported by the General Cartographic Transformation package of the United States Geological Survey, with any Earth ellipsoid model. EOSAT also offers a variety of scene sizes, including a 1/2 by 1 degree sub-scene (approximately 55.5 kilometres by 80 kilometres at 45 degrees North latitude), which is the equivalent of the United States Geological Survey 1:100,000 map sheet. This product is an important addition to the EOSAT product line. Full and quarter Landsat scenes are also available as geocoded products.

17. The geographical search for Landsat data is initiated by EOSAT through a computer search. The output from this search is transferred to the customer in the form of a computer listing with a key, from which Landsat products can be selected and ordered. General guidelines on price schedules for data products are provided in annex I.

18. As announced by EOSAT on 22 January 1990, a new format (Fast Format) will be standard for TM digital products delivered after 1 March 1990. Products will still

be available in the previous format after that date, but only as special orders and at a higher cost than equivalent products in Fast Format. According to EOSAT, by establishing Fast Format as the standard digital product, the speed and efficiency of the Landsat production system has been significantly improved.

19. Under agreements with International Landsat Data Distribution Centers, data from Landsat as well as from SPOT can also be obtained directly from the centres listed in table 1.

Table 1

INTERNATIONAL LANDSAT DATA DISTRIBUTION CENTERS

ARGENTINA
COMISION NACIONAL DE INVESTIGACIONES ESPECIALES (CNIE)
CENTRO DE PROCESAMIENTO
AVENUE DORREGO 4010
1425 BUENOS AIRES, ARGENTINA
TELEPHONE: 722-5108
TELEX: 17511 LANBA AR

AUSTRALIA
AUSTRALIA LANDSAT STATION
22-36 OATLEY COURT
P.O. BOX 28
BELCONNEN, ACT 2616
AUSTRALIA
TELEPHONE: 062-515411
TELEX: 61510

BRAZIL
INPE-DGI
CAIXA POSTAL 01
CACHOEIRA PAULISTA-CEP 12,630
SAO PAULO, BRAZIL
TELEPHONE: (125) 611507
OR PBX: (125) 611377
TELEX: (122) 160 INPE BR

CANADA
CANADA CENTRE FOR REMOTE SENSING (CCRS)
USER ASSISTANCE AND MARKETING UNIT
717 BELFAST ROAD
OTTAWA, ONTARIO K1A OY7
CANADA
TELEPHONE: 613-995-1210
TELEX: 053-3777

INDIA
NATIONAL REMOTE SENSING AGENCY
DEPARTMENT OF SPACE
BALANAGAR, HYDERABAD - 500 037
ANDHRA PRADESH, INDIA
TELEPHONE: 262572-77
TELEX: 0155-522 OH 01556522

INDONESIA
INDONESIAN NATIONAL INSTITUTE OF AERONAUTICS AND SPACE (LAPAN)
JL PEMUDA PERSIL NO. 1
P.O. BOX 3048
JAKARTA, INDONESIA
TELEX: 49175 LAPAN IA

EUROPEAN SPACE AGENCY
ESA-ESRIN
EARTHNET USER SERVICES
VIA GALILEO GALILEI
I-00044 FRASCATI, ITALY
TELEPHONE: 39-6-9401360 OR 39-6-94011
TELEX: 610637 ESRIN

JAPAN
REMOTE SENSING TECHNOLOGY CENTER OF JAPAN (RESTEC)
UNI-ROPPONGI BLDG., 7-15-17 ROPPONGI
MINATO-KU, TOKYO 106, JAPAN
TELEPHONE: TOKYO 3-403-1761
TELEX: 02426780 RESTECJ

PAKISTAN
PAKISTAN SPACE AND UPPER ATMOSPHERE RESEARCH COMMISSION (SUPARCO)
43-1/P-6 PECKS
P.O. BOX 3125
KARACHI-AZ, PAKISTAN
TELEX: 25720 SPACE PK

PEOPLE'S REPUBLIC OF CHINA
ACADEMIA SINICA
LANDSAT GROUND STATION
PEOPLE'S REPUBLIC OF CHINA
TELEPHONE: 284861 (BEIJING, CHINA)
TELEX: 210222 ASCHI CN

REPUBLIC OF SOUTH AFRICA
NATIONAL INSTITUTE FOR TELECOMMUNICATIONS RESEARCH
ATTN: SATELLITE REMOTE SENSING CENTER
P.O. BOX 3718
JOHANNESBURG 2000, REPUBLIC OF SOUTH AFRICA
TELEPHONE: 27-12-26-5271 AND 27-11-642-4693
TELEX: 3-21005 SA

SAUDI ARABIA
KING ABDULAZIZ CITY FOR SCIENCE & TECHNOLOGY
P.O. BOX 6086
RIYADH, SAUDI ARABIA
TELEX: 201590 SANCST SPACE SJ

THAILAND
REMOTE SENSING DIVISION
NATIONAL RESEARCH COUNCIL OF THAILAND (NRCT)
196 PHAHONYOTHIN ROAD, BANGKHEN
BANGKOK 10900 THAILAND
TELEX: 82213 NARECOU TH
TELEPHONE: 579-0116
CABLE: NRC BANGKOK

UNITED STATES
EARTH OBSERVATION SATELLITE COMPANY (EOSAT)
C/O EROS DATA CENTER
SIOUX FALLS, SD 57198
TELEPHONE: (605) 594-2291 OR 800-367-2801
TELEX: 910-668-0310 EDC SFL

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B. SPOT-IMAGE

20. SPOT-IMAGE has established a catalogue of SPOT data received at two central stations and at regional direct read-out stations. This catalogue, computerized and remotely accessible, allows users anywhere in the world, 24 hours a day, to identify scenes already available in a given geographical location, their quality and the mode (panchromatic or multispectral, or incidence angle). The objective of SPOT-IMAGE is to distribute the data to users. If the data have been received and processed at one of the two principal receiving stations, SPOT-IMAGE will deliver them direct; if they have been received at one of the regional direct read-out stations, SPOT-IMAGE will request the station operator to ship or mail them to the user. In addition, SPOT-IMAGE provides users with value-added or derived products, which have been generated either in-house or by other agencies or companies.

21. The pricing policy for data distributed by SPOT-IMAGE, either directly or indirectly through its distributors, has been established so that both the operating and the capital costs of the system are covered (see annex II for the SPOT product fee schedule). Inquiries on data availability go through a computer search, which is facilitated by forms completed by users of SPOT data.

22. The SPOT "Catalog Inquiry" form is used to identify scenes in the archive of SPOT-IMAGE for a particular Grid Reference System (GRS). The licensee may specify a number of parameters in order to identify the user's image needs.

C. Swedish Space Corporation

23. The Swedish Space Corporation (SSC) already operates receiving and processing facilities for the Landsat, SPOT and Japanese MOS (Marine Observation Satellite) series of satellites. In 1991, Europe's ERS (European Remote Sensing Satellite) will be added.

24. Besides its programme to market value added remote-sensing data, SSC has announced new data sources. It will receive image data from the Soviet satellite systems Resurs and Okean, and sell data products to customers in Western Europe and on the world market. 3/

25. A preliminary agreement to this effect was signed recently in Moscow by SSC and the Institute of Space Devices Engineering of Glovkosmos, together with associated organizations in the remote-sensing area. The agreement commits both parties to negotiate a binding agreement within the next few months.

26. At present, the Resurs system includes two optical instruments. One is a five-channel conical scanning radiometer with a ground resolution of some 170 metres and a swath width of 600 kilometres. The other instrument is a three-channel CCD (Charged Coupled Device) type of sensor with a resolution of 45 metres and a swath width of 45 kilometres. Resurs carries an onboard tape recorder which will dump recorded data over Kiruna, Sweden.

D. SOYUZKARTA

27. SOYUZKARTA continues to provide assistance in conducting outer space surveys of countries and regions using multispectral scanners and cameras designed for topographic mapping installed on Soviet satellites. It provides consultations and services in the efficient use of the acquired images for the investigation and mapping of natural resources and renders assistance in the compilation of thematic maps on various scales.

28. A new data set is now available from the principal sensor on Okean, which is a side-looking radar with a ground resolution of about 1 kilometre and a swath width of 450 kilometres. There is also a microwave radiometer and a moderate resolution optical sensor with a swath width of about 1,000 kilometres. Okean has been designed primarily for ice reconnaissance. International marketing of KFA-1000 satellite photographic data in connection with the World Catalogue under agreement with the Central Trade Services Co-operation has been discontinued. The new contact address is: Central Trading System, 475 Montauk Highway, West Islip, New York 11795.

29. At present SOYUZKARTA markets remote-sensing photographs with spatial resolution of 5 metres to many countries of the world. It has long-standing agreements for the export of remote-sensing photographs with companies in Argentina, Brazil, the Islamic Republic of Iran, Japan, Peru, the United Arab Emirates, the United Kingdom of Great Britain and Northern Ireland and the United States of America, among other countries. Negotiations are under way for preparing the contracts for the thematic and topographic mapping of Brazil, Niger and Peru.

30. In connection with the acquisition of remote-sensing data, some of the commercial services offered by SOYUZKARTA are as follows:

(a) Export of remote-sensing data with ground spatial resolution of 5 metres;

(b) Complete natural resource cadastres through the application of remote-sensing data, including prospection of mineral deposits, land management, soil and vegetation mapping, and pasture classification by fertility, conditions and seasons;

(c) Services for the prospection of oil, gas, ore and other mineral deposits through the application of remote-sensing data.

31. The data from SOYUZKARTA are available commercially. The prices of some photographic products are shown in table 2.

Table 2. SOYUZKARTA price list, July 1989

(United States dollars)

Camera resolution	KFA-1000 5 m		MK-4 6-8 m			KATE-200 15-30 m		
	Black and white	Colour	Black and white 1 band	Black and white 3 bands	Colour	Black and white 1 band	Black and white 3 bands	Colour
Film positive	1 180	1 560	1 050	2 520	1 950	230	550	450
Film negative	1 260	1 650	1 110	2 660	2 070	250	580	480
Paper print, enlarged 4-5 times	1 150	1 400	440	880	1 600	220	470	420
Digital record on magnetic tape	2 100	-	1 450	4 350	-	500	1 500	-

Source: Space Markets, No. 1 (1990), p. 19.

III. ACTIVITIES OF THE NATURAL RESOURCES AND ENERGY DIVISION OF THE DEPARTMENT OF TECHNICAL CO-OPERATION FOR DEVELOPMENT

32. The Natural Resources and Energy Division of the Department of Technical Co-operation for Development of the Secretariat provides technical assistance to developing countries in the planning, construction, maintenance and operation of a wide variety of public works. Cartography, surveying and mapping, and remote sensing are vital tools in the planning and operation of infrastructure activities and are therefore included in the functions of the Division.

33. As at 1990, about 35 countries have received technical assistance and advisory services in remote sensing. As a result, projects have been designed for further implementation on either a multinational or bilateral assistance level. A wide range of activities are covered, starting from the simple processing of remote-sensing data to the establishment of the infrastructure of a fully developed remote-sensing centre.

34. Technical co-operation activities in remote sensing include the preparation of projects for the establishment of remote-sensing centres at both the national and the regional levels. These projects focus on providing interpretation equipment, training and institutional support, with the long-term objective of enabling developing countries to use this technology autonomously in support of their development programmes.

35. Assistance in institution-building or direct support for remote-sensing applications is provided by means of technical co-operation projects to which both the United Nations and the requesting Government contribute. For its part, the Department of Technical Co-operation for Development makes available technical advisory services rendered by staff members and international experts, assists in the training of local personnel, both in-country and overseas, and provides various items of the equipment needed to meet the objectives of the projects. The Government usually provides, inter alia, in-country facilities and support personnel; in some instances, it also provides national professionals.

36. With reference to Economic and Social Council resolution 1989/8, in which the Council, on the recommendation of the Committee on Natural Resources, requested the Secretary-General to intensify his efforts, within existing resources, in the dissemination of available remote-sensing software packages in both the commercial and the public sectors, the Department is in the process of preparing an interregional seminar on digital image processing of multispectral data, to be held in 1991. The objectives of the seminar are:

(a) To inform participants about the latest development in digital image processing, including software packages;

(b) To develop guidelines for transferring image processing and the required software packages to developing countries;

(c) To establish management procedures for applications of digital image processing in natural resources development;

(d) To provide assistance to developing countries to further enhance their technical co-operation with launching countries in order to benefit from future space missions carrying multispectral sensors.

37. Participants from developing countries will be identified by the Department and selected according to the Department's standards and procedures. It is intended to encourage the participation in the seminar of the commercial and the public sectors dealing with the dissemination of remote-sensing software packages.

IV. CONCLUSION

38. Remote-sensing techniques have expanded rapidly during the past few years and global networks for acquiring and disseminating remote-sensing data commercially have been established. In order to satisfy the requirements of the international community, large data banks and referral systems have been established for users of remote-sensing data. In view of the continuing financial constraints of the Organization, it is recommended that Member States take full advantage of these facilities.

39. The Committee may take into consideration the expertise and facilities available in the Natural Resources and Energy Division of the Department of Technical Co-operation for Development for further promoting the use of remote

sensing in resources exploration, especially for the benefit of developing countries. Such promotion could include a clearing-house function in connection with the dissemination of information on the development of remote-sensing technology to Member States and the continuation of the integration of remote-sensing data sets into projects for exploring natural resources.

Notes

1/ W. G. Brooner, P. M. Manghan and D. A. Thibault, An Association of Information Demands for Remote Sensing and Geographic Information System Technology (Washington, D.C., Earth Satellite Corporation, 1988).

2/ U. R. Rao and S. Chandraschekar, "International issues in remote sensing", in Proceedings of the Indian Academy of Sciences, vol. 6 (1983), pp. 377-386.

3/ "Swedish Space Corporation to receive and sell imagery from Soviet satellites", Remote Sensing, No. 12 (June 1990).

Annex I

EOSAT PRICE SCHEDULE
EFFECTIVE MARCH 1, 1990

TM DIGITAL GEOCODED

1) Fast Format only 2) 6250 Bpi*

Order Code	Product	Scene Size	Price	Copy Price†
TGF6	Full Scene	185 x 170 km	$4900	$90/tape**
TGQ6	Quadrant	100 x 100 km	3600	90/tape**
TGM6	Map Sheet	Approx 55.5 x 91.2 km	2500	90/tape**

TM STANDARD DIGITAL FULL AND QUADRANT SCENE

1) Fast Format only*** 2) 6250 Bpi*

Order Code	Product	Scene Size	Price	Copy Price†
TMFFSF	Full Scene	185 x 170 km	$3960	$270††
TMFFSQ-1	Quadrant	100 x 85 km	2500	90††

When ordering quads, indicate choice by changing last digit of order code to desired quad.
Example: TMFFSQ-1=quad 1, TMFFSQ-2=quad 2.

TM DIGITAL MOVABLE SCENE

1) Fast Format only 2) 6250 Bpi*

Order Code	Scene Size	Price	Copy Price†
TMSQ6	100 x 100 km	$3200	$90
TMMQ6	50 x 100 km (N-S x E-W)	2400	90
TMMQ6-A	100 x 50 km (N-S x E-W)	2400	90

TM EFP COLOR PRODUCTS

Bands 4,3,2 in (RGB) unless otherwise specified.

Full Scene

Size: 185 x 170 km

Order Code	Product	Scale	Price	Copy Price†
TMFF1	Positive Transparency	1:1,000,000	$1800	$360
TMFP1	Paper	1:1,000,000	1300	260
TMFP5	Paper	1:500,000	1400	280
TMFP2	Paper	1:250,000	1500	300

Quadrant Scene

Size: 92.5 x 85 km

Order Code	Product	Scale	Price	Copy Price†
TMQF5-1	Positive Transparency	1:500,000	$1200	$240
TMQP5-1	Paper	1:500,000	900	180
TMQP2-1	Paper	1:250,000	1000	200
TMQP1-1	Paper	1:100,000	1200	240

When ordering quads, indicate choice by changing last digit of order code to desired quad.
Example: TMQF5-1=quad 1, TMQF5-2=quad 2.

† When ordered at same time as original.
†† Number of tapes varies with product format and tape density.
* 1600 Bpi is available with a 10% surcharge.
** Number of tapes varies depending upon factors such as latitude, resample size, etc. Contact Customer Services for specific information at 800-344-9933 (U.S. except Maryland) or 301-552-0537.
*** LTWG format (BSQ or BIL) is a special order. Contact Customer Services for order codes.

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The Landsat archive contains only previously processed products. Before ordering from the archive, customers are encouraged to verify product availability by contacting Customer Services at 800-344-9933 (U.S. except Maryland) or 301-552-0537.

TM DIGITAL FLOPPY DISKS

1) Size: 15 x 15 km 2) PC/MS-DOS only

Order Code	Product Description	Price	Copy Price†
TFLOPC	Customer Selected from archive	$600	$120
TFLOPS-1	Mississippi River	250	-----
TFLOPS-2	San Joaquin Valley, CA	250	-----
TFLOPS-3	Black Hills, SD	250	-----
TFLOPS-4	Little Colorado River	250	-----
TFLOPS-5	New Orleans, LA	250	-----
TFLOPS-6	Morro Bay, CA	250	-----

TM DIGITAL FULL AND QUADRANT SCENE

1) LTWG Format

Product Description	Scene Size	Price	Copy Price†
Full Scene	185 x 170 km	$5,000	$90/tape††
Quadrant Scene	92.5 x 85 km	$3,000	$90/tape††

TM COLOR COMPOSITES

1) Size: 185 x 170 km 2) From archive only 3) Bands 4,3,2 in (RGB) unless otherwise specified.

Order Code	Product	Scale	Price	Copy Price†
TM53	Positive Transparency	1:1,000,000	$1800	$360
TM63	Paper	1:1,000,000	1300	260
TM64	Paper	1:500,000	1400	280
TM66	Paper	1:250,000	1500	300

TM BLACK-AND-WHITE PHOTO PRODUCTS

1) Size: 185 x 170 km 2) From archive only 3) Band 3 unless otherwise specified.

Order Code	Product	Scale	Price	Copy Price†
TM03	Negative Transparency	1:1,000,000	$550	$110
TM13	Positive Transparency	1:1,000,000	550	110
TM23	Paper	1:1,000,000	550	110
TM24	Paper	1:500,000	600	120
TM26	Paper	1:250,000	700	140

MSS DIGITAL PRODUCTS

1) Size: 185 x 170 km 2) LTWG format

Order Code	BSQ 6250	BSQ 1600	BIL 6250	BIL 1600	Price	Copy Price†
M184A		X			$1000	$120
M185A	X				1000	60
M184B				X	1000	120
M185B			X		1000	60

† When ordered at same time as original.
†† Number of tapes varies with product format and tape density.

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MSS COLOR COMPOSITES

1) Size: 185 x 170 km 2) Products will be generated using Bands 4,2,1 in (RGB) from Landsats 4 and 5; Bands 7,5,4 in (RGB) from Landsats 1, 2 and 3 unless otherwise specified.

Order Code	Product	Scale	Price	Copy Price†
MSS53	Positive Transparency	1:1,000,000	$600	$120
MSS63	Paper	1:1,000,000	550	110
MSS64	Paper	1:500,000	700	140
MSS66	Paper	1:250,000	1000	200

MSS BLACK-AND-WHITE PHOTO PRODUCTS

1) Size: 185 x 170 km 2) Products will be generated using Band 2 from Landsats 4 and 5, Band 5 from Landsats 1, 2, and 3 unless otherwise specified.

Order Code	Product	Scale	Price	Copy Price†
MSS03	Negative Transparency	1:1,000,000	$175	$35
MSS13	Positive Transparency	1:1,000,000	155	31
MSS23	Paper	1:1,000,000	95	19
MSS24	Paper	1:500,000	190	38
MSS26	Paper	1:250,000	290	58

Acquisition fee continues to be suspended.

Cloud Cover Surcharge: $350
MicroIMAGE TM: $250/yr
MicroIMAGE MSS: $250/yr
MicroCATALOG: Price varies with region.

†When ordered at same time as original.

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Annex II

SPOT Product Fee Schedule

Effective May 1, 1990
except where indicated

1. Standard Products

		Panchromatic	Multispectral
Computer Compatible Tapes (CCT)	*Level 1A, 1B* (Full Scene) 6250 or 1600 bpi	$2,200	$1,700
	Level 2 (Full Scene) 6250 or 1600 bpi	$3,500	$3,200
Film (30% discount w/corresponding CCT)	*Level 1A, 1B*		
	1:400,000 (Full Scene)	$1,500	$1,300
	1:200,000 (Full Scene)	$1,500	$1,400
	1:200,000 (1/4 Scene)	$ 750	$ 650
	1:100,000 (1/4 Scene)	$1,500	$1,400
	Level 2 1:400,000 (Full Scene)	$2,500	$2,000
Photographic Prints	When ordered with corresponding Level 1 CCT or film	$250	$250

2. Mapping Innovation Series – GIS related products

	Digital	Film
SPOT QuadMap™ (1:24,000) corresponds to any USGS 7.5 minute quad map, 4.8 meter pixel size B/W only *See Note 1*	$500 Both for $750	$600 (film or print)
SPOT GIS QuadMap™ simplified for GIS use – no border/annotations, 10 meter pixels *See Note 1*	$600 ($650 with contrast enhancement)	N.A.
SPOT MetroView™ – Georeferenced SPOT imagery of major U.S. metropolitan areas (Full scene) B/W only	$1,750	$2,365
SPOT Digital Terrain Model (DTM) (60%-100% of full scene size/ minimum of 820 sq. mi.)	$15,000	N.A.
SPOT Quarter scene DTM	$10,000	
SPOT CountyView™ – 1:24,000 SPOT photo image of any U.S. county B/W only	Under development	$2.50 per sq. mi (print only)
SPOT BasinView™ - complete coverage of any geologic basin in the world B/W only	$1.25/sq. mi. minimum 2,500 sq. mi.	N.A.

Note 1: If a DEM is required but is not available from U.S.G.S. there will be an additional $500/QuadMap charge

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3. Project Management Services

Our Project Management Group (PMG) produces SPOT-based solution packages and non-standard products, managing the necessary in-house and outside resources to accomplish this. Initial consultation at no expense. PMG standard rate: $150/hour

4. Miscellaneous Products

Promotional Data Sets	Digital	Photographic
SPOT Education and Evaluation Data Set (S.E.E.D.S.) (33 subscene set) Also available on diskette sets – call for information	$800/CCT or diskette set	$ 60 (slides)
Special Offer Images (Full U.S. Scenes)	$600	$400 (1:400,000 Film)
SPOT Art™	N.A.	$300 (unmounted) $400 (mounted)

SPOT User's Handbook (2 volumes) – $100

SPOT Worldwide Catalog	(set of 6 tapes) –	$120
	Quarterly Update –	$20.00 each

5. Satellite Acquisition Programming

	Standard	High Priority
Registration of Request	$100/scene	$1,500/scene
Completed Acquisition (does not include final product price)	$400/scene	$250/attempt (up to 10 attempts)

Scene shifting for all standard products – $100/scene.
Call for information on duplicate copy prices, rush services, processing options, photographic scales and non-standard products.
Additional information can be found in the document *SPOT Products and Services*.

Please note: All prices subject to change without notice. Volume and payment term discounts are available according to standard discount schedule.

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